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EXAMINER	
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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/771,876
Filing Date: January 29, 2001
Appellant(s): SONG ET AL.

Nirav Patel
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed June 14, 2004.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is incorrect. A correct statement of the status of the claims is as follows:

This appeal involves claims 1-8, 10-11, 13-19, 21-23, 25-26, 39-40, and 42-43.

Claims 45 and 46 are allowed.

Claim 44 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 28-38 and 41 are withdrawn from consideration as not directed to the elected invention.

Claims 9, 12, 20, 24, and 27 have been canceled.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is incorrect.

The amendment after final rejection filed on June 14, 2004 has not been entered.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 1-18, 10, 11, 13-19, 21-23, 25, 26, 39, 40, 42, and 43 stand or fall together. However, Appellant has separately argued claims 1, 5, and 22 and these arguments will be addressed in the Examiner's Answer.

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

US 5,207,893	IWAMOTO et al.	5-1993
US 4,994,254	SUZUKI et al.	2-1991
US 5,098,687	SKEELS et al.	3-1992
US 4,837,397	ABSIL et al.	6-1989
US 5,614,079	FARNOS et al.	3-1997

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-8, 10-11, 13-19, 21, and 39-40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "wherein the ratio of additional metal(s) is between 1:10 and 2.5:1." This limitation renders the claim indefinite because it is not clear which metals are in the ratio. It is believed that applicant intends to recite "wherein the ratio of the additional metal(s) to Al" as was recited in original claim 1.

Claims 1-8, 10, 21-22, and 42 are rejected under 35 U.S.C. 102(b) as being anticipated by Iwamoto et al.

Iwamoto et al. (US 5,207,893) discloses a catalyst composition useful in hydrocracking processes. The catalyst composition comprises an 10-90% of an iron-

containing crystalline aluminosilicate and 90-10% by weight of an inorganic binder (column 2, lines 50-55). Iwamoto et al. teaches that iron is contained in the zeolite in two forms: as deposited iron (referred to as inactive iron) and iron contained within the framework of the zeolite (column 3, lines 5-25). It is taught that the inactive iron content is not more than 35%, preferably not more than 35% by weight (column 3, lines 30-40). Suitable iron containing aluminosilicates include zeolite Y (column 4, lines 15-20). Suitable binders include boehmite gel and silica (column 6, lines 1-8). Iron containing aluminosilicates having an Fe/Al of 0.69, 0.89, 0.91, 0.84, and 0.82 are exemplified (columns 9-10, Table 1). Iwamoto et al. teaches that the iron containing aluminosilicate is prepared by contacting a zeolite such as zeolite Y with an iron salt in the presence of a mineral acid to incorporate the iron into the zeolite framework (column 2, lines 40-45 and column 5, lines 1-50). With reference to the examples, note that the initial silica to alumina ratio increases following the treatment with the mineral acid and iron salt, which means that iron is substituted for alumina which has been removed from the framework.

As each and every element of the claimed invention is taught in the prior art as recited above, the claims are anticipated by Iwamoto et al.

Claims 1, 3, 5-6, 10-11, 14, 16-18, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki et al.

Suzuki et al. (US 4,994,254) discloses a crystalline aluminogallosilicate useful in the preparation of a high octane gasoline. It is taught that the aluminogallosilicates preferably have an Al_2O_3/Ga_2O_3 ratio in the range of 2-4, which yields a Ga/Al of 0.25-

0.5 (column 5, lines 5-10). Most preferable silicates are of the MFI type (column 5, lines 10-15). It is taught that the aluminogallosilicates may be formed into various shapes using alumina or silica binders (column 5, lines 45-55). Example 2 details the formation of a catalyst composite containing 27% alumina binder (column 10). The composition may further include an active metal such as palladium or platinum in an amount in the range of 0.1-10% by weight (column 6, lines 15-25).

The process limitation in claim 5 is noted, i.e. isomorphic substitution of the metal for Al. However, when the examiner has found a substantially similar product as in the applied prior art, the burden of proof is shifted to applicant to establish that their product is patentably distinct and not the examiner to show the same process of making. *In re Brown*, 173 USPQ 685 and *In re Fessmann*, 180 USPQ 324. In this case, the reference teaches an aluminosilicate composition which incorporated gallium into the zeolite framework, which is the same product as instantly claimed, despite the different method of production.

As each and every element of the claimed invention is taught in the prior art as recited above, the claims are anticipated by Suzuki et al.

Claims 1-8, 10-11, 13-14, 16-19, 21-23, 25-26, 39, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Skeels et al. in view of Farnos et al. or Absil et al.

Skeels et al. (US 5,098,687) discloses zeolite compositions which are topologically related to prior known zeolites but which are characterized as containing

framework atoms of iron and/or titanium (column 1, lines 15-25). It is taught that the composition have a formula $(\Sigma_w Al_x Si_y)O_2$, wherein "Σ" represents at least one titanium and/or iron and w, x, and y represent the mole fractions of Σ, Al, and Si, respectively, present as tetrahedral oxides, said mole fractions being such that they are within the trigonal compositional area defined by points A, B, and C:

Point	w	x	y
A	0.49	0.01	0.50
B	0.01	0.49	0.50
C	0.01	0.01	0.98

Refer also to Figure 1. This corresponds to a Σ/Al ratio of 0.02-49, which meets the ranges instantly claimed.

Skeels et al. teaches that a crystalline zeolite is contacted with an effective amount of a fluoro salt of titanium and/or iron whereby framework aluminum atoms of the zeolite are removed and replaced by titanium and/or iron atoms (column 5, lines 20-35). Suitable zeolites include zeolite Y, mordenite, zeolite L, zeolite, beta zeolite, and ZSM-5 (column 6, lines 1-15 and column 8, lines 30-50). Note also the examples which detail the preparation of iron-substituted zeolite Y, iron-substituted mordenite, iron-substituted zeolite L, and titanium-substituted ZSM-5, which have Fe/Al and Ti/Al ratios falling within the ranges instantly claimed. Skeels et al. teaches a washing post-treatment to reduce the amount of salts in the zeolites (column 6, lines 35-55), which is considered to meet the deactivation step instantly claimed.

Skeels et al. teaches that the iron and/or titanium substituted zeolite compositions may be used as catalysts in various hydrocarbon conversion processes and may be combined with other known catalytic materials (column 45, lines 25-35). Specifically Skeels et al. teaches that substituted zeolites may be combined with Group VIII noble metals in amounts between about 3 and about 15 weight percent (column 48, lines 1-10).

Skeels et al. does not teach the use of a binder in combination with the metal substituted zeolite.

Farnos et al. (US 5,614,079) teaches that zeolite catalysts are often incorporated with a matrix or binder materials to impart strength during hydrocarbon conversion processes and that the most commonly used binder materials include alumna, clay, and silica (column 2, lines 60-69).

Absil et al. (US 4,837,397) teaches that on order to improve the physical strength of catalysts, the zeolite is formulated with a matrix or binder in order to improve its crushing strength and attrition resistance (column 5, lines 20-25). Suitable binders include alumina, silica, and magnesia, which is employed in amounts in the range of about 5 to about 80 percent (column 5, lines 25-65).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the composition taught by Skeels et al. in light of the teaching by either Farnos et al. or Absil et al. that zeolite catalysts are conventional combined with binders in order to impart strength and improve the attrition resistance of the composition.

Regarding claims 19 and 43, the modified disclosure of Skeels et al. does not specifically teach an iron-substituted ZSM-5. However, Skeels et al. suggests that either iron and/or titanium may be substituted into a zeolite such as ZSM-5 and further exemplifies a titanium substituted ZSM-5.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute iron in place of titanium in the ZSM-5 composition taught by Skeels et al. in light of the teaching by Skeels et al. that either titanium or iron may be used, suggesting that the use of iron is functionally equivalent to titanium.

(11) Response to Argument

I. Response to arguments regarding the rejection of claims 1-8, 10-11, 13-19, 21, and 39-40 under 35 U.S.C. 112, second paragraph.

Because the after final amendment submitted by Appellant has not been entered, the rejection of claim 1 and its dependents under 35 USC 112, second paragraph is still applicable for the reasons discussed above. Specifically, instant claim 1 has recited a ratio with only one component named; however, a ratio should compare at least two components. It is suggested that Appellant amend the claim to recite "wherein the ratio of the additional metal(s) to Al" which is consistent with the original claims and the specification.

Appellant further argues that the examiner has not provided any reasons supporting the rejection of claims 39-40 and as such, Appellant is unable to respond.

However, claims 39-40 depend, either directly or indirectly, upon claim 1, and include the limitation regarded by the examiner as indefinite.

II. Response to arguments regarding the rejection of claims 1-8, 10, 21-22, and 42 under 35 U.S.C. 102(b) as being anticipated by Iwamoto et al.

Appellant argues that Iwamoto et al. does not teach the inclusion of a binder in the range of 5-95% by weight as required by claim 1. It is not clear whether Appellant is arguing that (1) the inorganic oxide taught by Iwamoto et al. would not meet the binder claimed or (2) the 10-90% by weight would not meet the claimed 5-95% by weight. With respect to (1), , the reference teaches the use of an inorganic oxide in combination with the zeolite in an amount in the range of 10-90% by weight which meets the range 5-95% recited in the instant claims. It is noted that the inorganic oxide taught by the reference serves to bind the zeolite to form the disclosed support material. Refer to the description at columns 5-6 of the Iwamoto et al. reference. Thus, while Iwamoto et al. may not use the word "binder" per se, the reference teaches the use of the same material, in the same amounts, performing the same function in the composition. With respect to (2), the entire range taught by the reference is encompassed by the claimed range and there is a large degree of overlap, i.e. 10-90% as compared to 5-95%. Therefore, the range taught by the reference anticipates the claimed range.

Next, Appellant argues that Iwamoto et al. does not meet the limitation "under conditions effective for substituting aluminum in the aluminosilicate zeolitic material with metal." However, Iwamoto et al. teaches that the aluminum is substituted by iron. As no

specific conditions are required by claim 22, it is the position of the examiner, that the reference would meet the limitation "under conditions effective." Appellant argues that the Iwamoto reference does not teach the specific metal fluoride compounds disclosed in the specification. However, this argument is not commensurate in scope with what has been claimed. Claim 22 does not require any particular metal compound. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Finally, Appellant argues that the examiner's statement that the initial silica to alumina ratio increases following the treatment with the mineral acid and iron salt, which means that iron is substituted for alumina which has been removed from the framework, is contrary to the examples because of the weight percentages of salt used. However, it appears that applicant has misinterpreted the examples. The examples detail the preparation of an iron substituted aluminosilicate prepared from a zeolite having an initial SiO_2/Al_2O_3 of 5, using various concentrations of mineral acid, to yield SiO_2/Al_2O_3 of 22.3, 25.3, 18.2, etc. The data indicates that the alumina has decreased and been replaced by iron. There is no inconsistency as in each case the silica to alumina ratio of the original zeolite has been increased, reflecting the substitution of iron for alumina.

III. Response to arguments regarding the rejection of claims 1, 3, 5-6, 10-11, 14, 16-18, and 21 under 35 U.S.C. 102(b) as being anticipated by Suzuki et al.

With regards to the rejection under 35 USC 102(b) under the Suzuki et al. reference, Appellant argues that the Ga/Al ratio detailed in Table 4 detail a range of 0.036 to 2.78, while claim 1 requires a range of 0.1-2.5. With reference to column 10, calculations from the ratios provided in Table 4 yield the following:

Sample	SiO_2/Al_2O_3	SiO_2/Ga_2O_3	Ga_2O_3/Al_2O_3 (Ga/Al)
1	38	41	0.927
2	37.5	94.6	0.396
3	38	174.3	0.218
4	37.7	172	0.219
5	86.4	40.6	2.128
6	76.1	54.8	1.389
7	71	83.1	0.854
8	68.6	74.8	0.917
9	69.6	157.3	0.442
10	74	162.9	0.454
11	71.8	437.5	0.164
12	143.2	445.5	0.321
13	170	144.5	1.176
14	16	403.1	0.040
15	67.5	24.3	2.778
16	70.5	1984.3	0.036
17	858.7	446.5	1.923

Thus, the examiner submits that the claimed range meets the ranges taught by the Suzuki reference. In fact, Samples 1-13 and 17 provided in Table 4 specifically fall within the claimed range. Specific examples of compositions meeting the claimed range are anticipatory. Further, the reference teaches specifically that the ratio of Al_2O_3/Ga_2O_3 is preferably 2-4 (refer to column 5 of '254), which yields a Ga_2O_3/Al_2O_3 (by taking the inverse) of 0.25-0.5 and a Ga/Al of 0.25-0.5, which meets the range claimed.

Next, Appellant argues that the reference does not teach the amount of binder which may be employed. However, the reference teaches that a binder may be employed (refer to column 5, lines 45-60) and specifically teaches the preparation of a catalyst composite containing 27% by weight of an alumina binder (refer to column 10) which is a specific example which meets the range instantly claimed.

Appellant further argues that the reference does not teach a noble metal in the amount of 0.05 to 2% by weight. However, the reference teaches a noble metal in the range of 0.1-10% by weight. The value "0.1" is considered a specific example taught by the reference which would meet the claimed range. It is noted that this limitation is not required by claim 1.

Finally, Appellant argues with respect to the process recitation of claim 5 that reasons have been provided to differentiate the claimed composition. While it is not clear to what reasons Appellant is referring, the examiner notes that Appellant has not provided any evidence tending to demonstrate that the claimed product differs, structurally or in any way, by virtue of its process of making, from the product taught by Suzuki et al. The examiner further notes that such limitations are not required by the instant claim 1.

IV. Response to arguments regarding the rejection of claims 1-8, 10-11, 13-14, 16-19, 21-23, 25-26, 39, and 43 under 35 U.S.C. 103(a) as being unpatentable over Skeels et al. in view of Farnos et al. or Absil et al.

With regards to the various rejections over the Skeels et al. reference, Appellant argues that Skeels et al. does not teach metals such as Ga, Co, or mixtures of Fe, Ga, Ti, and Co. However, the reference teaches the use of iron and titanium substituted zeolites and therefore meets the claims for the elements Fe and Ti. Appellant argues that the catalysts required by the instant claims are characterized by the presence of one or more additional metals in addition to those typically found in an aluminosilicate zeolite lattice structure. The examiner submits that this is characteristic of the zeolite taught by the Skeels reference as well.

Appellant further argues that Skeels et al teaches catalysts including Group VIII metals alone, or in combination with Group VIB metals, in amounts between about 3 and about 15 weight percent. However, it is the position of the examiner that the endpoint "3" taught by the reference would be a specific example which meets the claimed range of 0.01-5 weight percent.

Finally, Appellant argues that it would not have been obvious to a person of ordinary skill in the art to substitute iron in place of titanium in the ZSM-5 composition taught by Skeels et al. Appellant further argues that incorporating the binders of Farnos and Absil would still not overcome the differences stated between the instant invention and the primary reference to Skeels et al.

This argument has been considered but is not persuasive. As Appellant recognizes, a legal conclusion of obviousness can only be found if the prior art references teach or suggest all of the claim limitations and further if the teaching or suggestion to make the claimed combination and the reasonable expectation of success is found in the prior art, and not based on appellant's own disclosure. In this case, Skeels et al. fairly teaches or suggests a zeolite composition containing Si, Al and Fe and/or Ti. Refer to column 1 of Skeels et al. The difference between the Skeels et al. reference and the instant claims is that Skeels et al. does not disclose the use of a binder. However, the secondary reference to either Farnos or Absil suggests that binders are conventionally employed to impart strength to catalysts when used in commercial processes. Refer to column 2 of Farnos et al. and column 5 of Absil et al. Therefore, one of ordinary skill would be motivated to formulate the catalyst taught by Skeels et al. with a binder in light of the teaching by either Farnos et al. or Absil et al. that doing so would result in a catalyst of increased strength. Appellant has failed to rebut the prima facie case of obviousness set forth by the examiner.

With respect to the obviousness of substituting iron for titanium, this rejection applies specifically to claims 19 and 43. In this case, the modified disclosure of Skeels et al. does not specifically teach an iron-substituted ZSM-5. However, Skeels et al. suggests that either iron and/or titanium may be substituted into a zeolite such as ZSM-5 and further exemplifies a titanium substituted ZSM-5. It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute iron in place of titanium in the ZSM-5 composition taught by Skeels et al. in light of the

teaching by Skeels et al. that either titanium or iron may be used, suggesting that the use of iron is functionally equivalent to titanium. Again, Appellant has failed to rebut the prima facie case of obviousness set forth by the examiner.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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7/19/04

CAI
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